(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) **EP 1 340 294 B1**

(12) **EUROPEAN PATENT SPECIFICATION**

(45) Date of publication and mention of the grant of the patent:
22.07.2009 Bulletin 2009/30

(21) Application number: **01992457.0**

(22) Date of filing: **26.10.2001**

(51) Int Cl.:
H01R 24/04 *(2006.01)*

(86) International application number:
PCT/US2001/050946

(87) International publication number:
WO 2002/037612 (10.05.2002 Gazette 2002/19)

(54) **MICROELECTRONIC CONNECTOR WITH OPEN-CAVITY INSERT**

MIKROELEKTRONISCHER VERBINDER HOHLRAUMEINSATZ

CONNECTEUR DE MICRO-ELECTRONIQUE AVEC INSERTION A CAVITE OUVERTE

(84) Designated Contracting States:
AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU MC NL PT SE TR

(30) Priority: **02.11.2000 US 705454**

(43) Date of publication of application:
03.09.2003 Bulletin 2003/36

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Printed by Jouve, 75001 PARIS (FR)

Description

Background of the Invention

Field of the invention

[0001] The invention relates generally to miniature electrical connectors used in printed circuit board and other microelectronic applications, and more particularly to a microelectronic connector with improved modularity and a method of fabricating the same.

Description of Related Technology

[0002] Existing microelectronic electrical connectors (such as those of the RJ 45 or RJ 11 type) frequently incorporate magnetics or other electrical components to provide a variety of function, such as signal voltage transformation or noise suppression. In one common connector design the magnetics or component package is fabricated as a separate device that is then subsequently inserted within or mated to another component of the connector. See, for example, U.S. patent No. 5,647,767 "Electrical Connector Jack Assembly for Signal Transmission° (" '767 patent"), and U.S. patent No. 5,587.884, "Electrical Connector Jack with Encapsulated Signal Conditioning Components" (" '884 patent"). A related design illustrated in U.S. patent No. 5,178,563, "Contact Assembly and Method for Making Same" employs the multicomponent arrangement of the 767 and'884 patens, yet with no installed electrical component Common to each of the aforementioned designs is the use of a separate lead insulator or "carrier" that insulates and segregates the electrical leads connecting the modular plug contacts with the electrical component for output leads of the connector). This general lead carrier arrangement is illustrated in Figure 1a.

[0003] Other background art is disclosed in U.S. Patent No. 5,736,910, « Modular Jack Connector with a Flexible Laminate Capacitor Mounted on a Circuit Board », and U.S. Patent No. 5,971,805, « Modular Jack with Filter insert ».

[0004] In addition to the functions listed above, as shown in figure 1b, a lead carrier 110 also acts as is mechanical fulcrum for the leads 120 when installed. Specifically, the distal ends 115 of the leads engage contacts of a modular plug 130 when the plug 130 is inserted into a connector body 100, thereby tending to bend the leads 120 upward and away from the plug 130. The modular plug 130 has a latch 131 which securely engages the plug 130 with the connector body 100. The plug 130 is shown in Figures 1b with the latch 131 on the underside of the plug, also referred to as a "latch-down" configuration. The carrier 110 tends to maintain the leads 120 in engagement with their respective contacts on the modular plug 130, thereby increasing the reliability of the connector. This is especially true during relative movement of the plug 130 within the connector body 100 or after many insertion/removal duty cycles.

[0005] While providing the above-identified functionality, the use of a lead carrier 110 has several drawbacks as well. Specifically, the additional labor and materials associated with molding and inspecting the lead carrier 110 add significant cost to the final product. Furthermore, the connector body ("sleeve") 100 requires additional costly tooling to accommodate the carrier 110. After carrier insertion, the distal ends of the leads 120 must also be bent into their final position. This adds another process step and precludes the subsequent removal of the leads 120 and carrier 110 from the connector body 100. Additionally, the carrier 110 provides no bias or resistance to separating the component package 140 (and carrier 110) from the connector body 100, thereby necessitating the use of adhesives or other means for maintaining a solid connection of these components.

[0006] Once an existing microelectronic connector has been installed in, for example, a printed circuit board, replacement of the component package 140 requires removal and replacement of the entire connector. Further, one set of leads 150 is typically soldered to the circuit board to provide mechanical stability and a secure electrical connection. Thus, removal of the connector and the attached component package 140 is made difficult.

[0007] Accordingly, it would be most desirable to provide an improved microelectronic connector design that would yield a simpler and more reliable connector, and further facilitate more economical fabrication. Such a connector design would avoid the use of a separate lead carrier and mating adhesives, thereby simplifying the manufacturing process and reducing device cost The improved connector would also utilize a simplified and compact mounting, system to further reduce manufacturing costs. Additionally, the improved connector would provide for simple replacement of components.

Summary of the Invention

[0008] The invention satisfies the aforementioned needs by providing an improved microelectronic connector and method of fabricating the same according to claims 1 and 7, respectively.

[0009] According to one aspect of the invention, a microelectronic connector assembly comprises an insert having a first cavity which is configured to receive at least one electrical component a set of leads extending from the insert the set of leads being configured to provide an electrical connection between the electrical component and a modular plug; and a connector body having a front a back, and a dividing wall separate the front from the back the front having a second cavity adapted to receive a modular plug therein, the back having a third cavity for receiving the insert, and thus dividing wall having a set of openings providing communication between the second cavity and the third cavity, wherein the set of leads are configured to protrude through the set of openings into the second cavity.

[0010] According to another aspect of the invention, a method of manufacturing a microelectronic connector comprises providing a connector body with a front having a first cavity adapted to receive modular plugs, a back having a second cavity adapted to receive an insert, and a dividing wall separating the front from the back, the dividing wall having openings for allowing leads to pass between the first cavity and the second cavity; and inserting an insert into the second cavity, the insert having a set of leads and a third cavity, the set of leads passing through the openings into the second cavity, the third cavity being adapted to receive at least one electrical component.

[0011] According to yet another aspect of the invention, a microelectionic connector assembly comprises an insert, the insert comprising means for receiving at least one electrical component and means for electrically connecting the electrical component with a modular plug; and a connector body, the connector body comprising means for receiving a modular plug in a first location; means for receiving the insert in a second location different from the first location; and means for separating the means for receiving a modular plug and the means for receiving the insert, the separating means including means for passing the electrically connecting means between the means for receiving a modular plug and the means for receiving the insert.

[0012] According to another aspect of the invention, a microelectronic connector assembly comprises an insert having a first cavity configured to receive at least one electrical component; and a connector body having a front, a back, and a dividing wall separating the front from the back, the front having a second cavity adapted to receive a modular plug therein, the back having a third cavity for receiving the insert, and the dividing wall having a set of openings providing communication between the second cavity and the third cavity.

Brief Description of the Drawings

[0013]

Figure 1a is an exploded perspective view of a prior art electrical component connector utilizing a lead carrier assembly.

Figure 1b is a side elevation view of the prior art connector of Figure 1a with modular plug inserted, showing the relative relationship of the leads, plug contacts, and lead carrier.

Figure 2A is a perspective view of the front portion of one embodiment of a connector body according to the invention.

Figure 2B is a perspective view of the back portion of the connector body shown in Figure 2A.

Figure 3 is a cross-sectional side view of the connector body of Figures 2A and 2B taken along line 3-3 of Figure 2A.

Figure 4 is a perspective view of an insert according to the present invention.

Figure 5 is a cross-sectional side view of the insert of Figure 4 taken along line 5-5 of Figure 4.

Figure 6 is a perspective view of relative arrangement of the insert shown in Figures 4 and 5 and the connector body of Figures 2A, 2B and 3.

Figure 7 is a cross-sectional view of a microelectronic connector according to another embodiment of the invention.

Detailed Description of the Invention

[0014] Reference is now made to the drawings wherein like numerals refer to like parts throughout.

[0015] Figures 2A, 2B and 3 illustrate a first embodiment of a connector body 200 of the invention. Referring initially to Figure 2A, the connector includes a body 200 which may be formed of a unitary construction. The connector body 200 is ideally formed from a nonconductive material, such as nylon, using an injection molding process of the type well known in the art, although other materials and processes may be substituted. The connector body 200 has a top wall 220 and side walls 230 which extend downward from opposite ends of the top wall 220 in planes that are perpendicular to that of the top wall 220. A separating wall 240 separates the back 250 of the connector body 200 from its front 210. The separating wall 240 extends downward from the top wall 220 in a plane that is perpendicular to that of the side walls 230. The front 210 has a cavity 260 for accommodating a modular plug (not shown) therein. The cavity 260 terminates at the separating wall 240. The back 250 also has a cavity 280 (not shown in Figure 2A) terminating at the separating wall 240.

[0016] The separating wall 240 is provided with a set of vertical openings 270. The number of openings 270 in the set corresponds to the number of leads to be provided for contacting a modular plug. The openings 270 in the separating wall 240 begin at the line of intersection of the separating wall 240 with the top wall 220 and extend downwardly from the intersection along the separating wall 240. The openings 270 allow communication between a cavity 280 in the back 250 of the connector body 200 and the cavity 260 in the front 210 of the connector body 200.

[0017] As seen in Figure 2B, the cavity 280 in the back 250 has side surfaces 282 with latching slots 284 defined along the interior surface thereof. The latching slots 284 extend from the back end of the side surfaces 282 of the cavity 280 inward to a latching point 285 (shown in Figure 3). The latching slots 284 run in a direction that is parallel to the line formed by the intersection of the top wall 220 and a side wall 230, while the latching point 285 protrudes from the side wall 230 and runs perpendicular to the latching slots 284.

[0018] The cavity 280 in the back 250 of the connector body 200 is adapted to receive an insert. Figures 4 and 5 illustrate one embodiment of an insert 400. The insert

400 includes an open cavity 410 for accommodating a magnetics or component package (not shown) to provide any of a variety of functions, such as signal voltage transformation or noise suppression. One or more electrical components may be integral with the component package.

[0019] It should also be noted that with respect to the invention, the term "electrical component" includes, without limitation, (i) discrete components such as resistors, capacitors, and inductors; (2) magneto-electric devices (such as choke coils and transformers); and (3) semiconductive devices.

[0020] In the embodiment illustrated in Figures 4 and 5, the insert 400 is configured substantially as a rectangular box. Referring to Figure 4, a back face 420 of the insert 400 defines the outer rim of the cavity 410. A front face 490 (see Figure 5) is configured as a rectangular wall and opposes the back face 420. The front face 490 is in a plane that is substantially parallel to that of the back face 420. The insert 400 also has a top face 460 and an opposing bottom face 470, each being perpendicular to the side faces 430 and the back face 420 and extending away from the back face 420. The insert 400 also comprises a first set 440 and a second set 450 of electrical leads extending from the top face 460 and the bottom face 470, respectively.

[0021] Two side faces 430 are connected to the front face 490 and the back face 420 and are in planes that are substantially perpendicular to those of the front face 490 and the back face 420. Each side face 430 is provided with a protrusion 432 located near the intersection of the side face 430 and the back face 420. The protrusion 432 extends from the side face 430 near the intersection, tapering to merge with the side face 430 away from the intersection, in a configuration so as to slide into the latching slots 284 (shown in Figure 2B) and to engage the latching point 285 (shown in Figure 3) of the connector body 200. The insert 400 can thus be secured within, for example, the cavity 280 (shown in Figures 2A, 2B and 3) in the back 250 of the connector body 200 by interlocking the protrusions 432 of the insert 400 with the corresponding latching point 285 of the connector body 200.

[0022] The first set of leads 440, with a first end 442 and a second end 444, is adapted to contact a modular plug within, for example, the cavity 260 in the front 210 of the connector body shown in Figures 2A and 3. A portion 446 of the first set of leads 440 near the first end 442 is completely embedded within the top face 460 of the insert 400 by, for example, molding the insert body 400 around the leads. The first end 442 of the first set of leads 440 protrudes from the back face 420 along a first edge 422 of the opening to the cavity 410. Alternatively and preferably, as illustrated in Figures 4 and 5, the portion 446 may be partially exposed to an upper wall 412 of the cavity 410. The first set of leads 440 extends upward from the top face 460 of the insert 400. At a location along the body of the leads 440, they are bent at a roughly 90-degree angle, forming a first bend 441, such that the leads 440 are substantially flush with the top face 460 of the insert 400 and extend in a horizontal direction toward the plane of the front face 490 of the insert 400. At another location along their body between the second end 444 and the first bend 441, the leads 440 are bent again at an angle of roughly 150 degrees to form a second bend 443.

[0023] The second set of leads 450, with a first end 452 and a second end 454, is adapted for providing an electrical connection with, for example, a printed circuit board. In accomplishing this, a portion 456 of the second set of leads 450 near the first end 452 is completely embedded within the bottom face 470 of the insert 400 by, for example, molding the insert body 400 around the leads. The first end 452 of the second set of leads 450 extends from the back face 420 along a second edge 424 of the opening to the cavity 410. Alternatively and preferably, as illustrated in Figure 5, the portion 456 may be partially exposed to a lower wall 414 of the cavity 410. The second set of leads 450 extends downward from the bottom face 470 of the insert 400. The leads 450 may then be bent in any direction necessary for a connection with, for example, a printed circuit board.

[0024] Figure 6 illustrates the insertion of the insert 400 into the connector body 200. The insert 400 slides into the cavity 280 in the back 250 of the connector body 200. The shape of the cavity 280 is configured to accommodate the shape of the insert 400. The protrusions 432 on the side faces 430 of the insert 400 slide into the latching slots 284 on the side surfaces 282 of the cavity 280 in the back 250 of the connector body 200. The first set of leads 440 of the insert 400 slide through the set of openings 270 (shown in Figure 2A) into the cavity 260 in the front 210 of the connector body 200. Thus, the leads 440 are placed in a position to contact a modular plug inserted into the cavity 260 in the front 210. When the insert 400 is completely inserted into the cavity 280, the protrusions 432 of the insert 400 engage the latching points 285 (shown in Figure 3) by interlocking the protrusions 432 with the latching points 285. The insert 400 is thereby securely attached to the connector body 200.

[0025] The cavity 410 of the insert 400 can accommodate electrical components (not shown) therein. The electrical components may be inserted within the cavity 410 either before or after insertion of the insert 400 into the connector body 200. The electrical components contact the first set of leads 440 and the second set of leads 450 of the insert 400. The point of this contact may either comprise the first ends 442, 452 of the leads 440, 450 or the portions 446, 456 (shown in Figures 4 and 5) of the leads 440, 450 partially exposed within the upper wall 412 and the lower wall 414 of the cavity 410. The electrical components may be secured within the cavity 410 with the use of a nonconductive adhesive or a mechanical latch. An adhesive may provide a secure, permanent connection of the electrical component to the first and second sets of leads 440, 450. A mechanical latch system may allow the electrical components to be readily re-

moved and replaced.

[0026] The embodiment of the insert 400 shown in Figures 4-6 provides a cavity 410 opening to the rear of the assembly when the insert 400 is inserted into the connector body 200. Figure 7 illustrates another embodiment of the insert 400 according to the invention in which the cavity 410 of the insert 400 opens forward. In this arrangement, the electrical components (not shown) must be inserted prior to the insertion of the insert 400 into the connector body 200 since access to the cavity 410 is not available after insertion.

[0027] Once the insert 400 is inserted into the connector body 200 (as shown in Figure 6 or Figure 7), the insert is easily removable. As discussed above, the insert 400 is securely attached in the connector body 200 when the protrusions 432 are interlocked with the latching points 285. This interlocking engagement is secure but not permanent. To remove the insert, the protrusions 432 can be depressed invardly by any flat small tool, thereby disengaging the protrusions 432 from the latching points 285. The insert 400 can then be removed from the connector body 200 as inward pressure on the protrusions 432 is maintained until the protrusions 432 clear the latching paints 285 and the insert 400 is fully removed from the cavity 280 of the connector body 200.

[0028] Thus, the invention provides a reliable microelectronic connector which is provided through simple fabrication and assembly. The connector according to the invention allows simple replacement of electrical components and provides increased modularity of the elements of the connector.

[0029] While the above detailed description has shown, described, and pointed out novel features of the invention as applied to various embodiments, it will be understood that various omissions, substitutions, and changes in the form and details of the device illustrated may be made by those skilled in the art.

Claims

1. A microelectronic connector assembly, comprising
   an insert (400) having a first face (460) and a second face (470), wherein the first face (460) and second face (470) define a first cavity (410) in said insert (400), said first cavity (410) being disposed between said first face (460) and said second face (470) ; said first cavity (410) being configured to receive at least one electrical component,
   a connector body (200) having a front (210), a back (250), and a dividing wall (240) separating said front (210) from said back (250), said front (210) having a second cavity (260) adapted to receive a modular plug therein, said back (210) having a third cavity (280) for receiving the insert (400), and said dividing wall (240) having a plurality of openings (270) providing communication between said second cavity (260) and said third cavity (280) ;
   a plurality of first leads (440) comprising first ends (442), the plurality of first leads (440) further comprising second ends (444) extending from said insert (400), said second ends (444) of the plurality of first leads (440) being configured to protrude through the plurality of openings (270) in the second cavity (260) to provide an electrical connection with a modular plug therein ; and
   a plurality of second leads (450) comprising first ends (452), the plurality of second leads (450) further comprising second ends (454) extending from said insert (400) and configured to provide an electrical connection with a printed circuit board.
   characterized in that:

   - the first ends (442) of said plurality of first leads (440) are embedded within the first face (460) such that a portion of the first ends (442) of the first leads (440) is exposed to the first cavity (410) so as to make an electrical connection with an electrical component received in the first cavity (410),
   - the first ends (452) of said plurality of second leads (450) arc embedded within the second face (470) such that a portion of the first ends (452) of the second leads (450) is exposed to the first cavity (410) so as to make an electrical connection with an electrical component received in the first cavity (410).

2. The microelectronic connector assembly according to claim 1, wherein the third cavity (280) comprises slots (284) configured to removably maintain the insert (400) therein.

3. The microelectronic connector assembly according to claim 2, wherein the insert (400), comprises protusions (432) which engage the slots (284).

4. The microelectronic connector assembly according to claim 1, wherein the first cavity (410), comprises an opening directed away from the connector body (200).

5. The microelectronic connector assembly according to claim 1, wherein the first cavity (410) comprises an opening directed into the connector body (200).

6. The microelectronic connector assembly according to claim 1, further comprising an electrical component package having at least one electrical component therein, the electrical component package configured to be received in the first cavity (410).

7. A method of manufacturing a microelectronic connector, comprising :

   providing an insert (400) having a first face (460)

and a second face (470) defining a first cavity (410), said first cavity (410) being disposed between said first face (460) and said second face (470), wherein said first cavity (410) is adapted to receive at least one electrical component ;
providing a connector body (200) with a front (210) having a second cavity (260) adapted to receive at least one modular plug, a back (250) having a third cavity (280) adapted to receive the insert (400), and a dividing wall (240) separating said front (210) from said back (250), said dividing wall (240) having openings (270) for allowing leads to pass between said second cavity (260) and said third cavity (280) ;
embedding first ends (442) of a plurality of first leads (440) within the first face (460) of the insert (400) such that a portion of the first ends (442) of the first leads (440) is exposed to the first cavity (410) such that the first leads (440) are configured to make an electrical connection with an electrical component received in the first cavity (410) and wherein second ends (444) of the plurality of first leads (440) extend from said insert (400) through the openings (270) into the second cavity (260) and are configured to provide an electrical connection with a modular plug;
embedding first ends (452) of a plurality of second leads (450) within the second face (470) of the insert such that a portion of the first ends (452) of the second leads (450) is exposed to the first cavity (410) so as to make an electrical connection with an electrical component received in the first cavity (410), and wherein second ends (454) of the plurality of second leads (450) extend from said insert (400) and are configured to provide an electrical connection with a printed circuit board ; and
inserting the insert (400) into the third cavity (280) such that the second ends (444) of the plurality of first leads (440) extend from said insert (400) through the openings (270) into the second cavity (260) to provide an electrical connection with a modular plug, wherein the second ends (454) of the plurality of second leads (450) extend from said insert (400) to provide an electrical connection with a printed circuit board.

8. The method according to claim 7, wherein the insert (400) is provided with notches, and wherein the second cavity (260) is provided with slots (284) said method further comprising.
engaging the notches of the insert (400) with the slots (284) of the second cavity (260) so as to secure the insert (400) within said third cavity (280).

9. The method according to claim 7, wherein the first cavity (410) of the insert (400) comprises an opening directed away from the connector body (200).

10. The method according to claim 7, wherein the first cavity (410) of the insert (400) comprises an opening directed into the connector body (200).

11. The method according to claim 7, further comprising inserting an electrical component into the first cavity (410) such that the electrical component contacts the first and second leads (440, 450).

Patentansprüche

1. Mikroelektronische Verbindungsgliedanordnung mit:

einem Einsatz (400) mit einer ersten Seite (460) und einer zweiten Seite (470), wobei die erste Seite (460) und die zweite Seite (470) einen ersten Hohlraum (410) in diesem Einsatz (400) definieren, wobei der erste Hohlraum (410) zwischen der ersten Seite (460) und der zweiten Seite (470) angeordnet ist; wobei der erste Hohlraum (410) dafür ausgebildet ist, zumindest eine elektrische Komponente aufzunehmen,
einem Verbindungsgliedkörper (200) mit einer Vorderseite (210), einer Rückseite (250) und einer Trennwand (240), welche die Vorderseite (210) von der Rückseite (250) trennt, wobei die Vorderseite (210) einen zweiten Hohlraum (260) aufweist, der dafür eingerichtet ist, darin einen modularen Stecker aufzunehmen, wobei die Rückseite (210) einen dritten Hohlraum (280) zur Aufnahme des Einsatzes (400) aufweist, und wobei die Trennwand (240) eine Vielzahl von Öffnungen (270) aufweist, welche eine Verbindung zwischen dem zweiten Hohlraum (260) und dem dritten Hohlraum (280) herstellen;
einer Vielzahl von ersten Leitungen (440) mit ersten Enden (442), wobei die Vielzahl von ersten Leitungen (440) ferner sich von dem Einsatz (400) aus erstreckende zweite Enden (444) aufweist, wobei diese zweiten Enden (444) der Vielzahl von ersten Leitungen (440) derart ausgebildet sind, dass sie durch die Vielzahl von Öffnungen (270) in dem zweiten Hohlraum (260) hervorragen, um eine elektrische Verbindung mit einem modularen Stekker darin herzustellen; und
einer Vielzahl von zweiten Leitungen (450) mit ersten Enden (452), wobei die Vielzahl von zweiten Leitungen (450) ferner sich von dem Einsatz (400) aus erstreckende zweite Enden (444) aufweist, die derart ausgebildet sind, dass sie eine elektrische Verbindung mit einer gedruckten Schaltung herstellen können,

dadurch gekennzeichnet, dass:

- die ersten Enden (442) der Vielzahl von ersten Leitungen (440) in der ersten Seite (460) derart eingebettet sind, dass ein Bereich der ersten Enden (442) der ersten Leitungen (440) zu dem ersten Hohlraum (410) hin frei liegt, um eine elektrische Verbindung mit einer in dem ersten Hohlraum (410) aufgenommenen elektrischen Komponente herzustellen,
- die ersten Enden (452) der Vielzahl von zweiten Leitungen (450) in der zweiten Seite (470) derart eingebettet sind, dass ein Bereich der ersten Enden (452) der zweiten Leitungen (450) zu dem ersten Hohlraum (410) hin frei liegt, um eine elektrische Verbindung mit einer in dem ersten Hohlraum (410) aufgenommenen elektrischen Komponente herzustellen.

2. Mikroelektronische Verbindungsgliedanordnung gemäß Anspruch 1, wobei der dritte Hohlraum (280) Schlitze (284) aufweist, die dafür ausgebildet sind, den Einsatz (400) herausnehmbar darin zu halten.

3. Mikroelektronische Verbindungsgliedanordnung gemäß Anspruch 2, wobei der Einsatz (400) Vorsprünge (432) aufweist, welche in die Schlitze (284) eingreifen.

4. Mikroelektronische Verbindungsgliedanordnung gemäß Anspruch 1, wobei der erste Hohlraum (410) eine von dem Verbindungsgliedkörper (200) weg gerichtete Öffnung aufweist.

5. Mikroelektronische Verbindungsgliedanordnung gemäß Anspruch 1, wobei der erste Hohlraum (410) eine in den Verbindungsgliedkörper (200) hinein gerichtete Öffnung aufweist.

6. Mikroelektronische Verbindungsgliedanordnung gemäß Anspruch 1 mit ferner einem elektrischen Komponentenpaket, welches zumindest eine elektrische Komponente darin aufweist, wobei das elektrische Komponentenpaket dafür ausgebildet ist, in dem ersten Hohlraum (410) aufgenommen zu werden.

7. Verfahren zur Herstellung eines mikroelektronischen Verbindungsgliedes, mit:

Bereitstellung eines Einsatzes (400) mit einer ersten Seite (460) und einer zweiten Seite (470), welche einen ersten Hohlraum (410) definieren, wobei der erste Hohlraum (410) zwischen der ersten Seite (460) und der zweiten Seite (470) angeordnet ist; wobei der erste Hohlraum (410) dafür ausgebildet ist, zumindest eine elektrische Komponente aufzunehmen,
Bereitstellung eines Verbindungsgliedkörpers (200) mit einer Vorderseite (210) mit einem zweiten Hohlraum (260), der dafür eingerichtet ist, zumindest einen modularen Stecker aufzunehmen, einer Rückseite (250) mit einem dritten Hohlraum (280), der dafür eingerichtet ist, den Einsatz (400) aufzunehmen, und einer Trennwand (240), welche die Vorderseite (210) von der Rückseite (250) trennt, wobei die Trennwand (240) Öffnungen (270) aufweist, um Leitungen zu ermöglichen, zwischen dem zweiten Hohlraum (260) und dem dritten Hohlraum (280) zu verlaufen;
Einbettung erster Enden (442) einer Vielzahl von ersten Leitungen (440) innerhalb der ersten Seite (460) des Einsatzes (400), so dass ein Bereich der ersten Enden (442) der ersten Leitungen (440) zu dem ersten Hohlraum (410) hin derart frei liegt, dass die ersten Leitungen (440) dafür ausgebildet sind, eine elektrische Verbindung mit einer in dem ersten Hohlraum (410) aufgenommenen elektrischen Komponente herzustellen, und wobei sich zweite Enden (444) der Vielzahl von ersten Leitungen (440) von dem Einsatz (400) aus durch die Öffnungen (270) in den zweiten Hohlraum (260) hinein erstrecken und dafür ausgebildet sind, eine elektrische Verbindung mit einem modularen Stecker herzustellen;
Einbettung erster Enden (452) einer Vielzahl von zweiten Leitungen (450) innerhalb der zweiten Seite (470) des Einsatzes, so dass ein Bereich der ersten Enden (452) der zweiten Leitungen (450) zu dem ersten Hohlraum (410) hin frei liegt, um eine elektrische Verbindung mit einer in dem ersten Hohlraum (410) aufgenommenen elektrischen Komponente herzustellen, und wobei sich zweite Enden (454) der Vielzahl von zweiten Leitungen (450) von dem Einsatz (400) aus erstrecken und dafür ausgebildet sind, eine elektrische Verbindung mit einer gedruckten Schaltung herzustellen; und
Einsetzen des Einsatzes (400) in den dritten Hohlraum (280), so dass sich die zweiten Enden (444) der Vielzahl von ersten Leitungen (440) von dem Einsatz (400) aus durch die Öffnungen (270) in den zweiten Hohlraum (260) hinein erstrecken, um eine elektrische Verbindung mit einem modularen Stekker herzustellen, wobei sich die zweiten Enden (454) der Vielzahl von zweiten Leitungen (450) von dem Einsatz (400) aus erstrecken, um eine elektrische Verbindung mit einer gedruckten Schaltung herzustellen.

8. Verfahren gemäß Anspruch 7, wobei der Einsatz (400) mit Rasten versehen ist, und wobei der zweite Hohlraum (260) mit Schlitzen (284) versehen ist, wobei das Verfahren ferner aufweist:

Eingreifen der Rasten des Einsatzes (400) in die

Schlitze (284) des zweiten Hohlraums (260), um den Einsatz (400) innerhalb des dritten Hohlraumes (280) zu befestigen.

9. Verfahren gemäß Anspruch 7, wobei der erste Hohlraum (410) des Einsatzes (400) eine von dem Verbindungsgliedkörper (200) weg gerichtete Öffnung aufweist.

10. Verfahren gemäß Anspruch 7, wobei der erste Hohlraum (410) des Einsatzes (400) eine in den Verbindungsgliedkörper (200) hinein gerichtete Öffnung aufweist.

11. Verfahren gemäß Anspruch 7 mit ferner dem Schritt des Einführens einer elektrischen Komponente in den ersten Hohlraum (410) derart, dass die elektrische Komponente die ersten und zweiten Leitungen (440, 450) berührt.

Revendications

1. Ensemble connecteur micro-électronique, comprenant :

un insert (400) ayant une première face (460) et une deuxième face (470), dans lequel la première face (460) et la deuxième face (470) définissent une première cavité (410) dans ledit insert (400), ladite première cavité (410) étant disposée entre ladite première face (460) et ladite deuxième face (470),
ladite première cavité (410) étant configurée pour recevoir au moins un composant électrique ;
un corps de connecteur (200) ayant un avant (210), un arrière (250), et une cloison (240) séparant ledit avant (210) dudit arrière (250), ledit avant (210) ayant une deuxième cavité (260) apte à recevoir une fiche modulaire dans celle-ci, ledit arrière (210) ayant une troisième cavité (280) pour recevoir l'insert (400), et ladite cloison (240) ayant une pluralité d'ouvertures (270) assurant la communication entre ladite deuxième cavité (260) et ladite troisième cavité (280) ;
une pluralité de premières broches (440) comprenant des premières extrémités (442), la pluralité de premières broches (440) comprenant en outre des deuxièmes extrémités (444) s'étendant dudit insert (400), lesdites deuxièmes extrémités (444) de la pluralité de premières broches (440) étant configurées pour faire saillie à travers la pluralité d'ouvertures (270) dans la deuxième cavité (260) pour assurer une connexion électrique avec une fiche modulaire à l'intérieur de celle-ci ; et
une pluralité de deuxièmes broches (450) comprenant des premières extrémités (452), la pluralité de deuxièmes broches (450) comprenant en outre des deuxièmes extrémités (454) s'étendant dudit insert (400) et configurées pour assurer une connexion électrique avec une carte de circuit imprimé,

caractérisé en ce que :

- les premières extrémités (442) de ladite pluralité de premières broches (440) sont intégrées à la première face (460) de sorte qu'une portion des premières extrémités (442) premières broches (440) soit exposée à la première cavité (410) pour établir une connexion électrique avec un composant électrique reçu dans la première cavité (410),
- les premières extrémités (452) de ladite pluralité de deuxièmes broches (450) sont intégrées à la deuxième face (470) de sorte qu'une portion des premières extrémités (452) des deuxièmes broches (450) soit exposée à la première cavité (410) de manière à établir une connexion électrique avec un composant électrique reçu dans la première cavité (410).

2. Ensemble connecteur micro-électronique selon la revendication 1, dans lequel la troisième cavité (280) comprend des fentes (284) configurées pour maintenir de manière amovible l'insert (400) à l'intérieur de celle-ci.

3. Ensemble connecteur micro-électronique selon la revendication 2, dans lequel l'insert (400) comprend des protubérances (432) qui se mettent en prise avec les fentes (284).

4. Ensemble connecteur micro-électronique selon la revendication 1, dans lequel la première cavité (410) comprend une ouverture dirigée à l'écart du corps de connecteur (200).

5. Ensemble connecteur micro-électronique selon la revendication 1, dans lequel la première cavité (410) comprend une ouverture dirigée dans le corps de connecteur (200).

6. Ensemble connecteur micro-électronique selon la revendication 1, comprenant en outre un boîtier de composants électriques ayant au moins un composant électrique à l'intérieur de celui-ci, le boîtier de composants électriques étant configuré pour être reçu dans la première cavité (410).

7. Procédé de fabrication d'un connecteur micro-électronique, comprenant les étapes consistant à :

fournir un insert (400) ayant une première face

(460) et une deuxième face (470) définissant une première cavité (410), ladite première cavité (410) étant disposée entre ladite première face (460) et ladite deuxième face (470), ladite première cavité (410) étant apte à recevoir au moins un composant électrique ;
fournir un corps de connecteur (200) avec un avant (210) ayant une deuxième cavité (260) apte à recevoir au moins une fiche modulaire, un arrière (250) ayant une troisième cavité (280) apte à recevoir l'insert (400), et une cloison (240) séparant ledit avant (210) dudit arrière (250), ladite cloison (240) ayant des ouvertures (270) pour permettre à des broches de passer entre ladite deuxième cavité (260) et ladite troisième cavité (280) ;
intégrer des premières extrémités (442) d'une pluralité de premières broches (440) à la première face (460) de l'insert (400) de sorte qu'une portion des premières extrémités (442) des premières broches (440) soit exposée à la première cavité (410) de sorte que les premières broches (440) soient configurées pour assurer une connexion électrique avec un composant électrique reçu dans la première cavité (410) et dans lequel des deuxièmes extrémités (444) de la pluralité de premières broches (440) s'étendent dudit insert (400) à travers les ouvertures (270) dans la deuxième cavité (260) et sont configurées pour assurer une connexion électrique avec une fiche modulaire ;
intégrer des premières extrémités (452) d'une pluralité de deuxièmes broches (440) à la deuxième face (470) de l'insert de sorte qu'une portion des premières extrémités (452) des deuxièmes broches (450) soit exposée à la première cavité (410) de manière à établir une connexion électrique avec un composant électrique reçu dans la première cavité (410), et dans lequel des deuxièmes extrémités (454) de la pluralité de deuxièmes broches (450) s'étendent dudit insert (400) et sont configurées pour assurer une connexion électrique avec une carte de circuit imprimé ; et
insérer l'insert (400) dans la troisième cavité (280) de sorte que les deuxièmes extrémités (444) de la pluralité de premières broches (440) s'étendent dudit insert (400) à travers les ouvertures (270) dans la deuxième cavité (260) pour assurer une connexion électrique avec une fiche modulaire, dans lequel les deuxièmes extrémités (454) de la pluralité de deuxièmes broches (450) s'étendent dudit insert (400) pour assurer une connexion électrique avec une carte de circuit imprimé.

8. Procédé selon la revendication 7, dans lequel l'insert (400) est muni d'encoches, et dans lequel la deuxième cavité (260) est munie de fentes (284), ledit procédé comprenant en outre l'étape consistant à :

mettre en prise les encoches de l'insert (400) avec les fentes (284) de la deuxième cavité (260) de manière à fixer l'insert (400) dans ladite troisième cavité (280).

9. Procédé selon la revendication 7, dans lequel la première cavité (410) de l'insert (400) comprend une ouverture dirigée à l'écart du corps de connecteur (200).

10. Procédé selon la revendication 7, dans lequel la première cavité (410) de l'insert (400) comprend une ouverture dirigée dans le corps de connecteur (200).

11. Procédé selon la revendication 7, comprenant en outre l'étape consistant à insérer un composant électrique dans la première cavité (410) de sorte que le composant électrique soit en contact avec les premières et deuxièmes broches (440, 450).

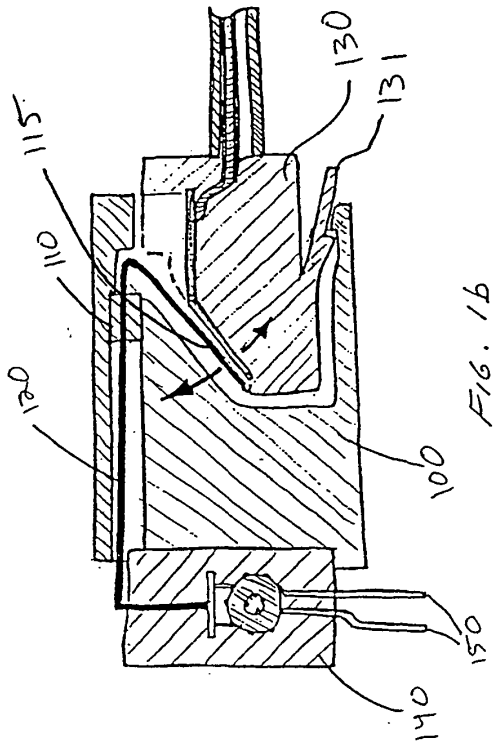


FIG. 1b
(PRIOR ART)

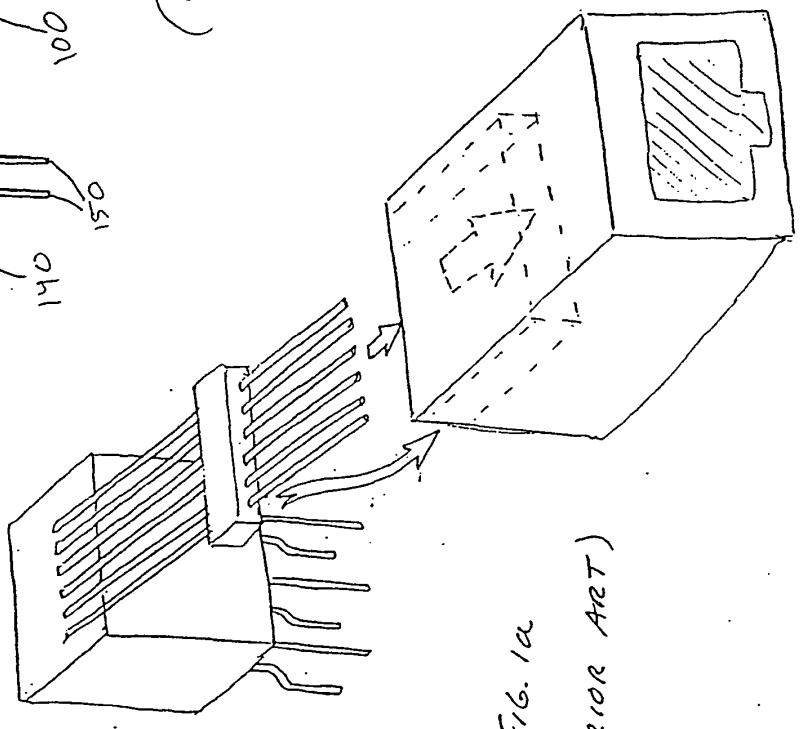


FIG. 1a
(PRIOR ART)

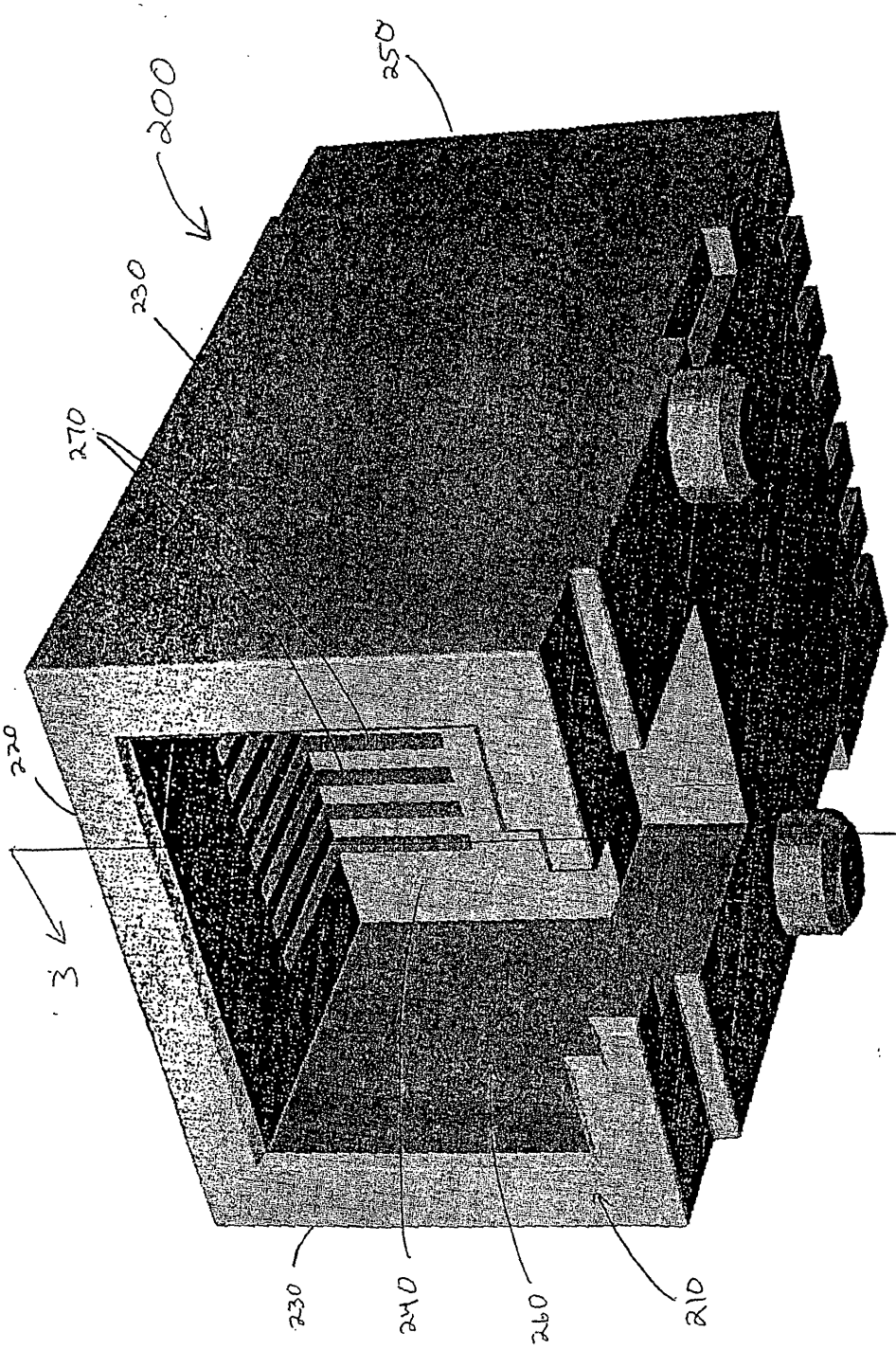


Figure 2A

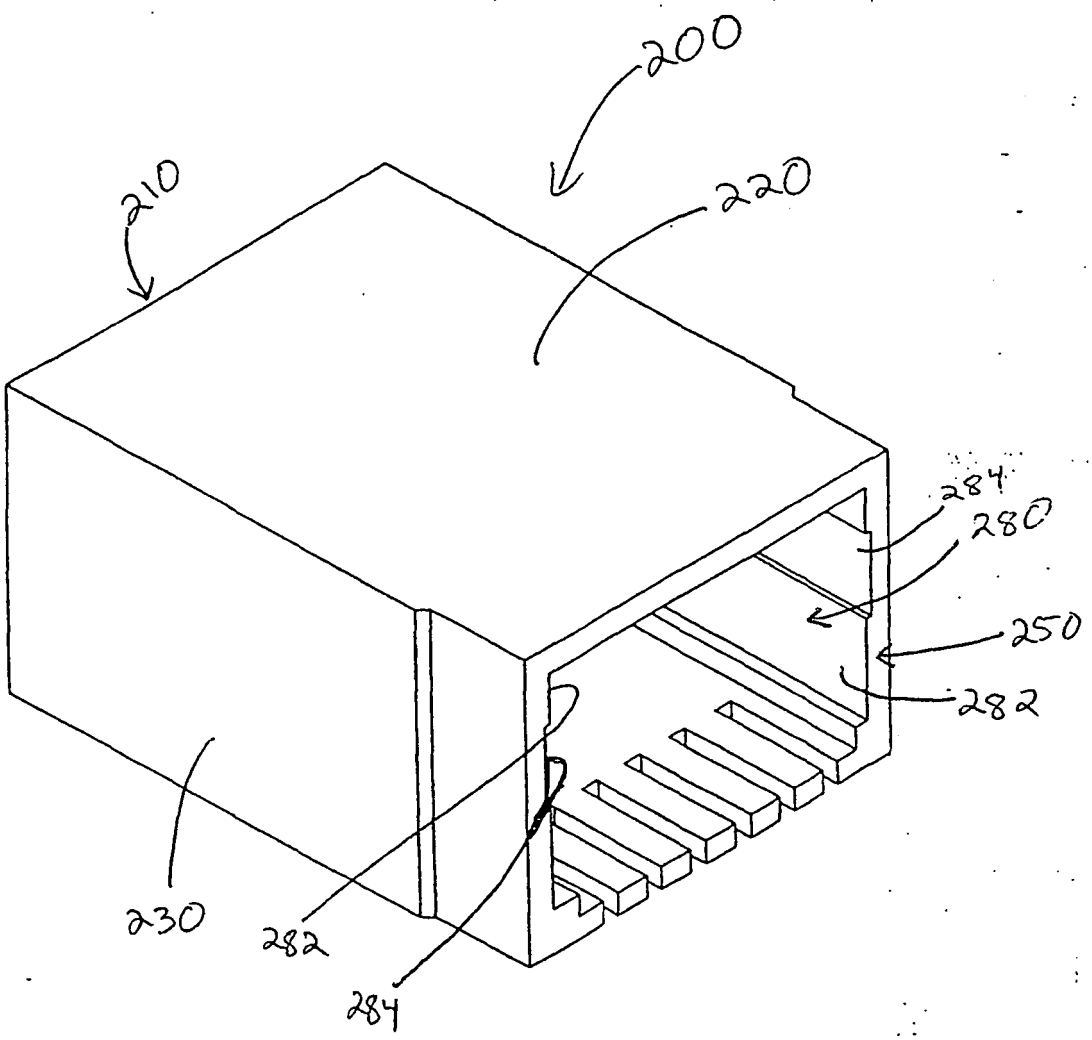


Figure 2B

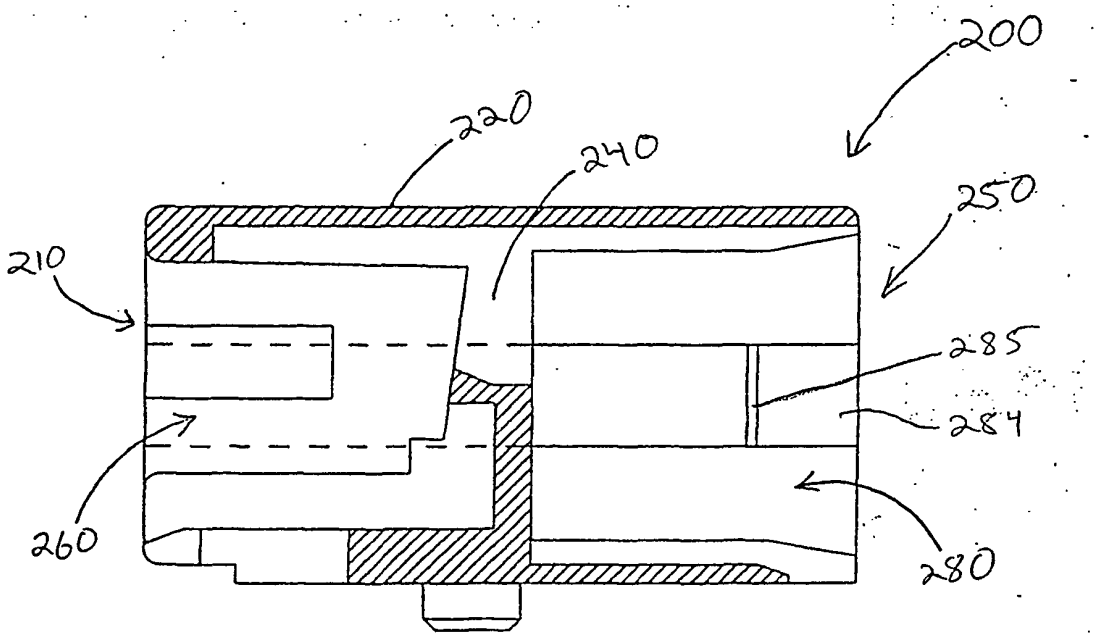


Figure 3

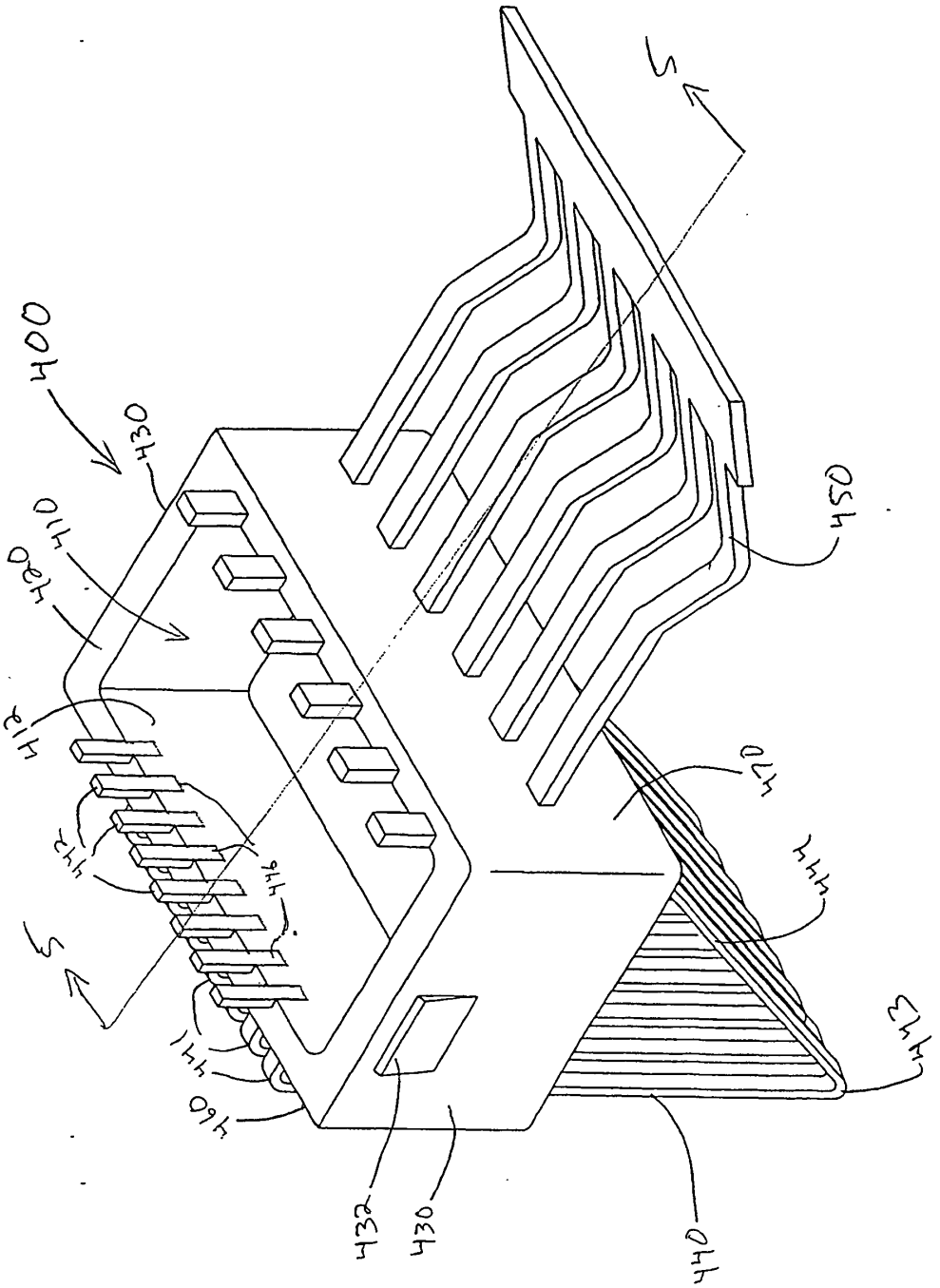


Figure 4

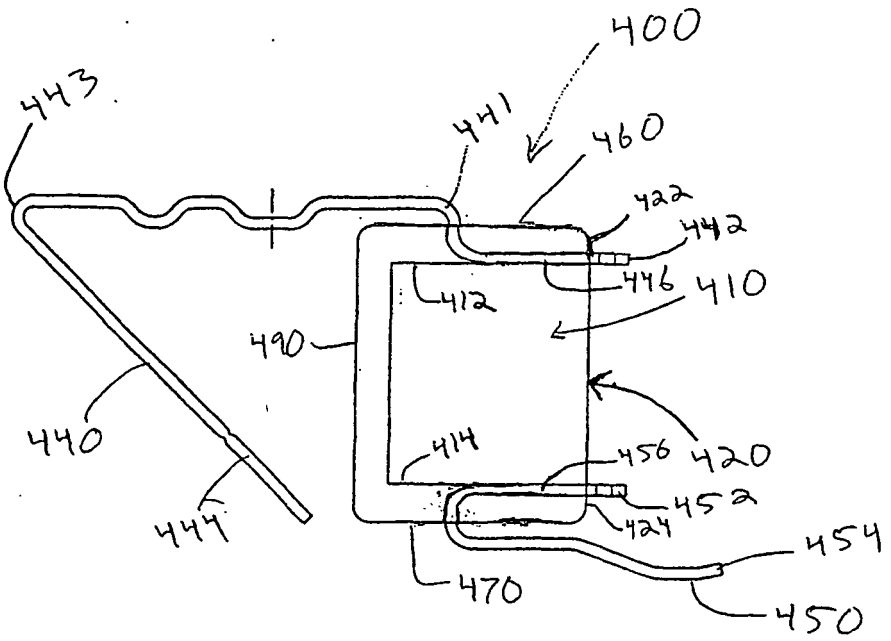

400
443
441
460
422
442
446
410
412
490
440
414
456
420
452
444
424
454
470
450

Figure 5

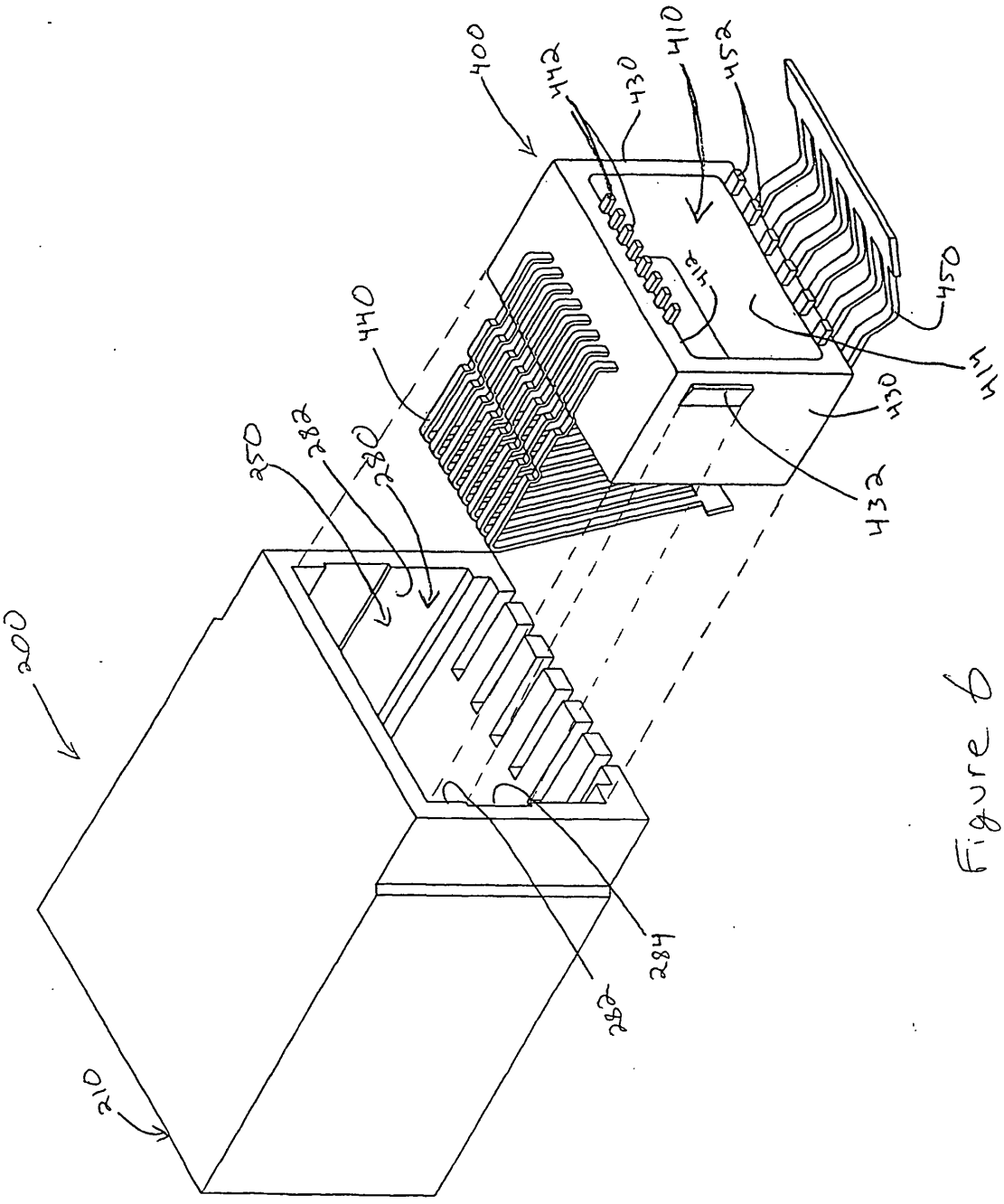

400
412
420
410
452
412
450
414
440
430
432
250
282
280
200
484
482
210

Figure 6

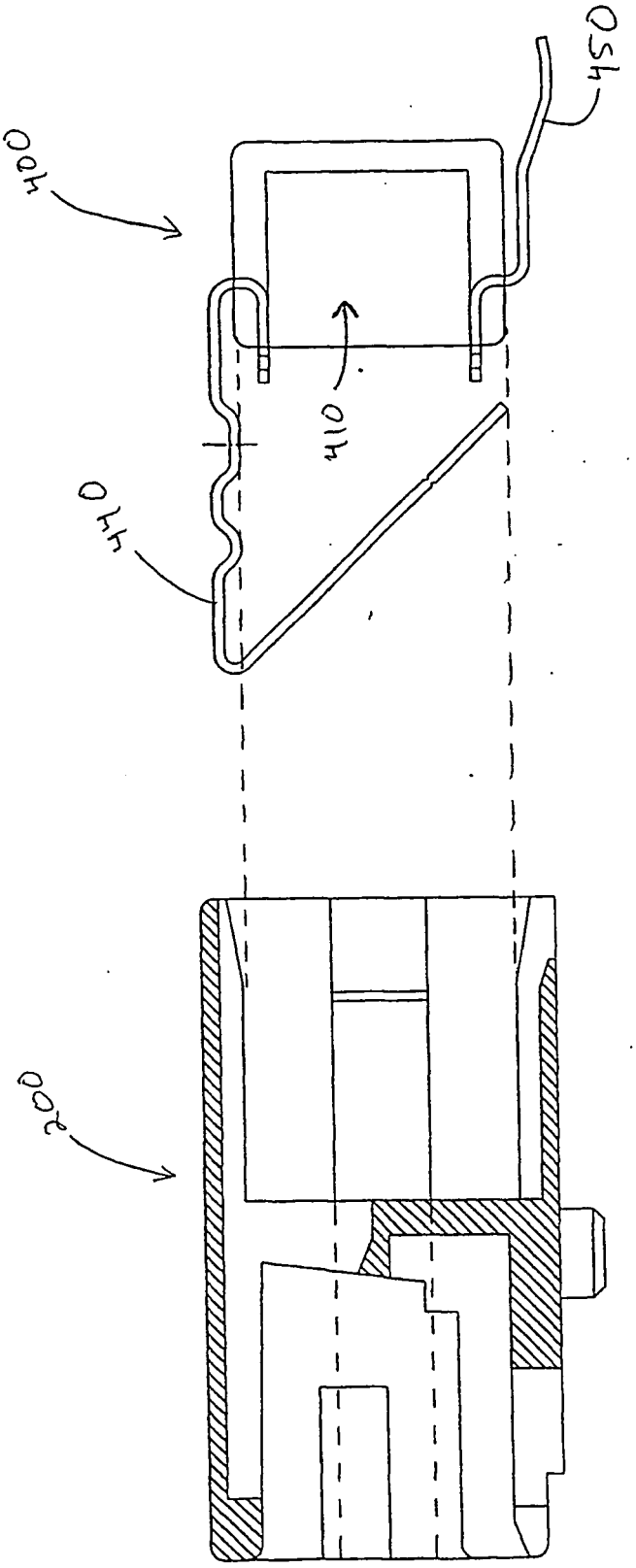


Figure 7

REFERENCES CITED IN THE DESCRIPTION

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